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EXAMINER	
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ART UNIT	PAPER NUMBER
2613	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/626,055	HOANG ET AL.
	Examiner	Art Unit
	Shi K. Li	2613

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 August 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-16,18-21,23-46,48-53,55-60,62-67,69-72,74 and 75* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-16,18-21,23-46,48-53,55-60,62-67,69-72,74 and 75* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5/7/2007*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 48 and 75 are objected to because of the following informalities: claim 48 should depend on claim 43 and claim 75 should depend on claim 71. Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-3 and 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Golmie et al. (N. Golmie et al., "A Differentiated Optical Services Model for WDM Networks", IEEE Communications Magazine, February 2000) in view of Assi et al. (C. Assi et al., "Optical Networking and Real-Time Provisioning: An Integrated Vision for the Next-Generation Internet", IEEE Network, July/August 2001), Kodialam et al. (U.S. Patent Application Pub. 2002/0018264 A1) and Holender et al. (U.S. Patent 6,069,894).

Regarding claim 1, Golmie et al. teaches in FIG. 3 and Table 1 to divide a WDM network into separate service levels. The difference between Golmie et al. and the claimed invention is that Golmie et al. does not teach to determine service level topologies. However, it is obvious that in order to setup lightpaths for various service levels in the WDM network, it is necessary to determine network topologies. For example, Assi et al. teaches in FIG. 2 that a WDM network can be considered as an N-layer network, where N is the number and wavelengths. Similarly, a network with different service levels assigned to different wavelengths can be considered as a multi-layer network. Kodialam et al. teaches in FIG. 2 to find network topologies for a service level by eliminating links that are occupied. This gives a network topology that consists the

currently available links. One of ordinary skill in the art would have been motivated to combine the teaching of Assi et al. and Kodialam et al. with the WDM network of Golmie et al. because the approach of Assi et al. and Kodialam et al. provides a network topology that represents the available resource that can be used for lightpath allocation. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to determine service level topologies for each service level, as taught by Assi et al. and Kodialam et al., in the WDM network of Golmie et al. because it provides network topologies that represent the available resources that can be used for lightpath allocation for each service level.

Inherently, each service level topology of the modified WDM network of Golmie et al., Assi et al. and Kodialam et al. is smaller than the physical network topology. To strengthen the rejection, Holender et al. is cited for teaching in FIG. 2 that a logical network topology is smaller than the physical network. One of ordinary skill in the art would have been motivated to combine the teaching of Holender et al. with the modified WDM network of Golmie et al., Assi et al. and Kodialam et al. to implement a smaller database based on the smaller service level network topology because a smaller database means faster operations. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement a smaller database based on the smaller service level network topology, as taught by Holender et al., in the WDM network of Golmie et al., Assi et al. and Kodialam et al. because a smaller database means faster operations.

Furthermore, Assi et al. teaches in page 39, left col., 5th paragraph that optical networks can also pose added wavelength continuity constraints. Kodialam et al. teaches in paragraphs [0045] and [0046] that there are OXC with wavelength conversion capability and there are OXC

without wavelength conversion capability. In network consisting of OXC with wavelength conversion capability, conversion criteria must be taken into consideration. In network consisting of OXC without wavelength conversion, the conversion free constraint must be met.

Regarding claim 2, Golmie et al. teaches in Table 1 BER.

Regarding claim 3, it is understood that OSPF provides connectivity for each node and network topology is the combination of connectivity for all nodes in the network.

Regarding claims 5-6, Assi et al. teaches in page 39, left col., 5th paragraph that optical networks can also pose added wavelength continuity constraints. Kodialam et al. teaches in paragraphs [0045] and [0046] that there are OXC with wavelength conversion capability and there are OXC without wavelength conversion capability. In network consisting of OXC with wavelength conversion capability, conversion criteria must be taken into consideration. In network consisting of OXC without wavelength conversion, the conversion free constraint must be met.

4. Claims 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Golmie et al. (N. Golmie et al., "A Differentiated Optical Services Model for WDM Networks", IEEE Communications Magazine, February 2000) in view of Kodialam et al. (U.S. Patent Application Pub. 2002/0018264 A1) and Holender et al. (U.S. Patent 6,069,894).

Golmie et al. teaches in FIG. 3 and Table 1 to divide a WDM network into separate service levels according to QoS criteria. The difference between Golmie et al. and the claimed invention is that Golmie et al. does not teach connectivity based on a conversion criteria. Kodialam et al. teaches in paragraphs [0045] and [0046] that there are OXC with wavelength conversion capability and there are OXC without wavelength conversion capability. In network

consisting of OXC with wavelength conversion capability, conversion criteria must be taken into consideration to avoid blocking. One of ordinary skill in the art would have been motivated to combine the teaching of Kodialam et al. with the WDM network of Golmie et al. because wavelength conversion allows a light path to take different wavelengths along the path and avoid blocking while wavelength conversion is expensive and such resource is limited and must be shared among lightpaths. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to take wavelength conversion into consideration, as taught by Kodialam et al., in the WDM network of Golmie et al. because wavelength conversion allows a light path to take different wavelengths along the path and avoid blocking while wavelength conversion is expensive and such resource is limited and must be shared among lightpaths. Inherently, each service level topology of the modified WDM network of Golmie et al. and Kodialam et al. is smaller than the physical network topology. To strengthen the rejection, Holender et al. is cited for teaching in FIG. 2 that a logical network topology is smaller than the physical network. One of ordinary skill in the art would have been motivated to combine the teaching of Holender et al. with the modified WDM network of Golmie et al. and Kodialam et al. to implement a smaller database based on the smaller service level network topology because a smaller database means faster operations. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement a smaller database based on the smaller service level network topology, as taught by Holender et al., in the WDM network of Golmie et al. and Kodialam et al. because a smaller database means faster operations.

Regarding claim 8, Golmie et al. teaches in Table 1 BER.

Regarding claim 9, Kodialam et al. teaches in paragraph [0024] to use link-state discovery method for tracking status of wavelengths.

5. Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Golmie et al., Kodialam et al. and Holender et al. as applied to claims 7-9 above, and further in view of Okajima et al. (U.S. Patent Application Pub. 2002/0120766 A1).

Golmie et al., Kodialam et al. and Holender et al. have been discussed above in regard to claims 7-9. The difference between Golmie et al., Kodialam et al. and Holender et al. and the claimed invention is that Golmie et al., Kodialam et al. and Holender et al. do not teach comparing parameters of links with service level parameters. Okajima et al. further teaches in FIG. 5 to monitor variable link metrics to determine whether link metrics have been changed and update link metrics accordingly. One of ordinary skill in the art would have been motivated to combine the teaching of Okajima et al. with the modified WDM network of Golmie et al., Kodialam et al. and Holender et al. because a link must meet service level criteria for providing the associated QoS. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to compare link parameters with classification criteria, as taught by Okajima et al., in the modified WDM network of Golmie et al., Kodialam et al. and Holender et al. because a link must meet service level criteria for providing the associated QoS.

6. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Golmie et al., Kodialam et al. and Holender et al. as applied to claims 7-9 above, and further in view of Ashwood Smith (U.S. Patent 6,738,354 B1).

Golmie et al., Kodialam et al. and Holender et al. have been discussed above in regard to claims 7-9. The difference between Golmie et al., Kodialam et al. and Holender et al. and the

claimed invention is that Golmie et al., Kodialam et al. and Holender et al. do not teach wavelength availability table. Ashwood Smith teaches in FIG. 3 to use wavelength availability tables 28a, 28b and 30 during lightpath setup. One of ordinary skill in the art would have been motivated to combine the teaching of Ashwood Smith with the modified WDM network of Golmie et al., Kodialam et al. and Holender et al. because a wavelength availability table keeps track of the availability of wavelengths and avoid assigning same wavelength to different lightpaths. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to include wavelength availability tables for keeping track of whether a wavelength is allocated or available, as taught by Ashwood Smith, in the modified WDM network of Golmie et al., Kodialam et al. and Holender et al. because a wavelength availability table keeps track of the availability of wavelengths and avoid assigning same wavelength to different lightpaths.

7. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Golmie et al., Kodialam et al. and Holender et al. as applied to claims 7-9 above, and further in view of Matsuura et al. (U.S. Patent Application Pub. 2003/0198227 A1).

Golmie et al., Kodialam et al. and Holender et al. have been discussed above in regard to claims 7-9. The difference between Golmie et al., Kodialam et al. and Holender et al. and the claimed invention is that Golmie et al., Kodialam et al. and Holender et al. do not teach to use number of wavelength conversion as criteria. Matsuura et al. teaches in paragraphs [0014] and [0017] that wavelength conversion devices are expensive and the number of wavelength conversion is kept to a minimum in setting up a lightpath. One of ordinary skill in the art would have been motivated to combine the teaching of Matsuura et al. with the modified WDM

network of Golmie et al., Kodialam et al. and Holender et al. to limit the number of wavelength conversion used because wavelength conversion devices are expensive and a OXC can have only limited number of wavelength conversion devices to be shared for all lightpaths. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use number of wavelength conversions as a criteria for service level, as taught by Matsuura et al., in the modified WDM network of Golmie et al., Kodialam et al. and Holender et al. to limit the number of wavelength conversions used because wavelength conversion devices are expensive and a OXC can have only limited number of wavelength conversion devices to be shared for all lightpaths.

8. Claims 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Golmie et al. (N. Golmie et al., "A Differentiated Optical Services Model for WDM Networks", IEEE Communications Magazine, February 2000) in view of Assi et al. (C. Assi et al., "Optical Networking and Real-Time Provisioning: An Integrated Vision for the Next-Generation Internet", IEEE Network, July/August 2001), Kodialam et al. (U.S. Patent Application Pub. 2002/0018264 A1) and Holender et al. (U.S. Patent 6,069,894).

Regarding claim 14, Golmie et al. teaches in FIG. 3 and Table 1 to divide a WDM network into separate service levels. The difference between Golmie et al. and the claimed invention is that Golmie et al. does not teach separate network topology database. However, it is obvious that in order to setup lightpaths for various service levels in the WDM network, it is necessary to have separate network topology database for each service level. For example, Assi et al. teaches in FIG. 2 that a WDM network can be considered as an N-layer network, where N is the number and wavelengths. Similarly, a network with different service levels assigned to

different wavelengths can be considered as a multi-layer network or N networks one for each service level. Kodialam et al. teaches in FIG. 2 to find network topologies for a service level by eliminating links that are occupied. This gives a network topology that consists the currently available links. One of ordinary skill in the art would have been motivated to combine the teaching of Assi et al. and Kodialam et al. with the WDM network of Golmie et al. because the approach of Assi et al. and Kodialam et al. provides a network topology that represents the available resource that can be used for lightpath allocation. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to determine service level topologies for each service level, as taught by Assi et al. and Kodialam et al., in the WDM network of Golmie et al. because it provides network topologies that represent the available resources that can be used for lightpath allocation for each service level. Kodialam et al. teaches in paragraph [0026] that IDR may be implemented by each node. That is, each node would store a network topology database for each service level.

Inherently, each service level topology of the modified WDM network of Golmie et al., Assi et al. and Kodialam et al. is smaller than the physical network topology. To strengthen the rejection, Holènder et al. is cited for teaching in FIG. 2 that a logical network topology is smaller than the physical network. One of ordinary skill in the art would have been motivated to combine the teaching of Holender et al. with the modified WDM network of Golmie et al., Assi et al. and Kodialam et al. to implement a smaller database based on the smaller service level network topology because a smaller database means faster operations. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement a smaller database based on the smaller service level network topology, as taught by Holender et al., in the

WDM network of Golmie et al., Assi et al. and Kodialam et al. because a smaller database means faster operations.

Furthermore, Assi et al. teaches in page 39, left col., 5th paragraph that optical networks can also pose added wavelength continuity constraints. Kodialam et al. teaches in paragraphs [0045] and [0046] that there are OXC with wavelength conversion capability and there are OXC without wavelength conversion capability. In network consisting of OXC with wavelength conversion capability, conversion criteria must be taken into consideration. In network consisting of OXC without wavelength conversion, the conversion free constraint must be met.

Regarding claim 15, Kodialam et al. teaches in paragraph [0045] that there are networks without wavelength conversion (i.e., conversion free).

Regarding claim 16, Kodialam et al. teaches in paragraph [0026] that the route server 102 stores network topology databases.

9. Claims 18-21, 24-25, 31-32, 34, 43-46 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Golmie et al. (N. Golmie et al., "A Differentiated Optical Services Model for WDM Networks", IEEE Communications Magazine, February 2000) in view of Assi et al. (C. Assi et al., "Optical Networking and Real-Time Provisioning: An Integrated Vision for the Next-Generation Internet", IEEE Network, July/August 2001), Kodialam et al. (U.S. Patent Application Pub. 2002/0018264 A1) and Holender et al. (U.S. Patent 6,069,894).

Golmie et al. teaches in FIG. 3 and Table 1 to divide a WDM network into separate service levels according to QoS criteria. Golmie et al. lists in Table 1 service level parameters and in FIG. 3 the wavelengths corresponding to a service level. The difference between Golmie et al. and the claimed invention is that Golmie et al. does not teach to form service level topology

structure. However, it is obvious that in order to setup lightpaths for various service levels in the WDM network, it is necessary to determine and maintain network topologies. For example, Assi et al. teaches in FIG. 2 that a WDM network can be considered as an N-layer network, where N is the number and wavelengths. Similarly, a network with different service levels assigned to different wavelengths can be considered as a multi-layer network. Kodialam et al. teaches in FIG. 2 to find network topologies for a service level by eliminating links that are occupied. This gives a network topology that consists the currently available links. One of ordinary skill in the art would have been motivated to combine the teaching of Assi et al. and Kodialam et al. with the WDM network of Golmie et al. because the approach of Assi et al. and Kodialam et al. provides a network topology that represents the available resource that can be used for lightpath allocation. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to determine service level topologies for each service level, as taught by Assi et al. and Kodialam et al., in the WDM network of Golmie et al. because it provides network topologies that represent the available resources that can be used for lightpath allocation for each service level.

Inherently, each service level topology of the modified WDM network of Golmie et al., Assi et al. and Kodialam et al. is smaller than the physical network topology. To strengthen the rejection, Holender et al. is cited for teaching in FIG. 2 that a logical network topology is smaller than the physical network. One of ordinary skill in the art would have been motivated to combine the teaching of Holender et al. with the modified WDM network of Golmie et al., Assi et al. and Kodialam et al. to implement a smaller database based on the smaller service level network topology because a smaller database means faster operations. Thus it would have been obvious

to one of ordinary skill in the art at the time the invention was made to implement a smaller database based on the smaller service level network topology, as taught by Holender et al., in the WDM network of Golmie et al., Assi et al. and Kodialam et al. because a smaller database means faster operations.

Furthermore, Assi et al. teaches in page 39, left col., 5th paragraph that optical networks can also pose added wavelength continuity constraints. Kodialam et al. teaches in paragraphs [0045] and [0046] that there are OXC with wavelength conversion capability and there are OXC without wavelength conversion capability. In network consisting of OXC with wavelength conversion capability, conversion criteria must be taken into consideration. In network consisting of OXC without wavelength conversion, the conversion free constraint must be met.

Regarding claim 19, Golmie et al. teaches in Table 1 BER.

Regarding claim 20, Golmie et al. teaches in FIG. 3 that class 1 consists of channel $\lambda 1$ and $\lambda 2$, class 2 consists of channel $\lambda 3$ and $\lambda 4$, etc.

Regarding claim 21, Kodialam et al. teaches that IDR can be implemented by router server 102 which is a centralized network server.

Regarding claims 24 and 31, Kodialam et al. teaches in paragraph [0041] to use OSPF which constructs topology from link state database. OSPF also teaches to maintain connectivity information to neighbors as link state.

Regarding claim 25, Golmie et al. teaches in Table 1 BER.

Regarding claim 32, Golmie et al. teaches in Table 1 BER.

Regarding claim 34, Golmie et al. teaches in p. 71, right col., last paragraph to p. 72, left col., first paragraph to classify link according to its qualities.

Regarding claim 43, Kodialam et al. teaches in FIG. 2 receive label switched path request.

Regarding claims 44 and 45, Golmie et al., Assi et al. and Kodialam et al. discuss optical networks. Therefore, the path is a lightpath or optical circuit.

Regarding claim 46, Assi et al. teaches real-time provisioning.

Regarding claim 49, Kodialam et al. teaches in paragraphs [0045] network without wavelength conversion capability (i.e., conversion free).

10. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Golmie et al. Assi et al., Kodialam et al. and Holender et al. as applied to claims 18-21, 24-25, 31-32, 34, 43-46 and 49 above, and further in view of Jukan et al. (A. Jukan et al., "Constraint-based Path Selection Methods for On-demand Provisioning in WDM Networks", IEEE INFOCOM 2002).

Golmie et al., Assi et al., Kodialam et al. and Holender et al. have been discussed above in regard to claims 18-21, 24-25, 31-32, 34, 43-46 and 49. The difference between Golmie et al., Assi et al., Kodialam et al. and Holender et al. and the claimed invention is that Golmie et al., Assi et al., Kodialam et al. and Holender et al. do not teach to form intersection of the link service level channel sets and the links of a path. However, it is implicitly taught by OSPF, or it is taught by Jukan et al. Jukan et al. teaches in p. 832, let~ col., first paragraph to take intersection of service level channel and the path channel. A path exists only if the intersection of the link service level channel for all links is not null. One of ordinary skill in the art would have been motivated to combine the teaching of Jukan et al. with the modified WDM network of Golmie et al., Assi et al., Kodialam et al. and Holender et al. because when the intersection is null, connectivity using wavelength in the service level set is not possible. Thus it would have

been obvious to one of ordinary skill in the art at the time the invention was made to form intersection of the service level channels set and links of a path, as taught by Jukan et al., in the modified WDM network of Golmie et al., Assi et al., Kodialam et al. and Holender et al. because when the intersection is null, connectivity using wavelength in the service level set is not possible.

11. Claims 26-29, 33 and 35-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Golmie et al., Assi et al., Kodialam et al. and Holender et al. as applied to claims 18-21, 24-25, 31-32, 34, 43-46 and 49 above, and further in view of RFC-2328 (Moy, RFC-2328, "OSPF Version 2", IETF, April 1998).

Golmie et al., Assi et al., Kodialam et al. and Holender et al. have been discussed above in regard to claims 18-21, 24-25, 31-32, 34, 43-46 and 49. The difference between Golmie et al., Assi et al., Kodialam et al. and Holender et al. and the claimed invention is that Golmie et al., Assi et al., Kodialam et al. and Holender et al. do not teach calculation of routing table and link management protocol. Kodialam et al. teaches in paragraphs [0025] and [0041] to use OSPF, therefore RFC-2328, OSPF Version 2, is included for the teaching of link management protocol. One of ordinary skill in the art would have motivated to combine the teaching of RFC-2328 with the modified WDM network of Golmie et al., Assi et al., Kodialam et al. and Holender et al. because it is suggested by Kodialam et al.

Regarding claims 26-29, RFC-2328 teaches in Section 16 calculation of routing table.

Regarding claim 33, RFC-2328 teaches in Section 10 neighbor states for keeping track of connectivity.

Regarding claims 35-36, RFC-2328 teaches in Section 16 calculating of routing table.

12. Claims 30, 57-60, and 62-63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Golmie et al., Assi et al., Kodialam et al. and Holender et al. as applied to claims 18-21, 24-25, 31-32, 34, 43-46 and 49 above, and further in view of Melaku et al. (U.S. Patent Application Pub. 2003/0074443 A1).

Golmie et al., Assi et al., Kodialam et al. and Holender et al. have been discussed above in regard to claims 18-21, 24-25, 31-32, 34, 43-46 and 49. The difference between Golmie et al., Assi et al., Kodialam et al. and Holender et al. and the claimed invention is that Golmie et al., Assi et al. and Kodialam et al. do not teach to change service level. Melaku et al. teaches in FIG. 5 QoS broker for handling service level change request. Melaku et al. teaches in paragraph. [0056] that if a user decides to change QoS requirements in the midst of a session, new resources are to be reallocated and a new path that meets the requested QoS is established. One of ordinary skill in the art would have been motivated to combine the teaching of Melaku et al. with the modified WDM network of Golmie et al., Assi et al., Kodialam et al. and Holender et al. because a QoS broker allows users to change service level depending on changes of their application needs. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a QoS broker for handling service level change requests, as taught by Melaku et al., in the modified WDM network of Golmie et al., Assi et al., Kodialam et al. and Holender et al. because a QoS broker allows users to change service level depending on changes of their application needs.

13. Claims 37-38, 40, 50-53, 56 and 71-72 are rejected under 35 U.S.C. 103(a) as being unpatentable over Golmie et al., Assi et al., Kodialam et al. and Holender et al. as applied to claims 18-21, 24-25, 31-32, 34, 43-46 and 49 above, and further in view of Freeman

("Telecommunication System Engineering" by R. Freeman, John Wiley & Sons, 1980, pp 99-103).

Golmie et al., Assi et al., Kodialam et al. and Holender et al. have been discussed above in regard to claims 18-21, 24-25, 31-32, 34, 43-46 and 49. The difference between Golmie et al., Assi et al., Kodialam et al. and Holender et al. and the claimed invention is that Golmie et al., Assi et al., Kodialam et al. and Holender et al. do not teach a machine-readable medium. Freeman teaches in Section 12 stored-program control (SPC). Freeman teaches in p. 100 to store method steps as program in memory for providing instructions to a controller or computer. One of ordinary skill in the art would have been motivated to combine the teaching of Freeman with the modified WDM network of Golmie et al., Assi et al., Kodialam et al. and Holender et al. because SPC is flexible and expandable such that it is easy to upgrade the system by rewriting the program. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use SPC and store program in machine-readable medium, as taught by Freeman, in the modified WDM network of Golmie et al., Assi et al., Kodialam et al. and Holender et al. because SPC is flexible and expandable such that it is easy to upgrade the system by rewriting the program.

14. Claims 39 and 41-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Golmie et al., Assi et al., Kodialam et al., Holender et al. and Freeman as applied to claims 37-38, 40, 50-53, 56 and 71-72 above, and further in view of RFC-2328 (Moy, RFC-2328, "OSPF Version 2", IETF, April 1998).

Golmie et al., Assi et al., Kodialam et al., Holender et al. and Freeman have been discussed above in regard to claims 37-38, 40, 50-53, 56 and 71-72. The difference between

Golmie et al., Assi et al., Kodialam et al., Holender et al. and Freeman and the claimed invention is that Golmie et al., Assi et al., Kodialam et al., Holender et al. and Freeman do not teach calculation of routing table and link management protocol. Kodialam et al. teaches in paragraphs [0025] and [0041] to use OSPF, therefore RFC-2328, OSPF Version 2, is included for the teaching of link management protocol. One of ordinary skill in the art would have motivated to combine the teaching of RFC-2328 with the modified WDM network of Golmie et al., Assi et al., Kodialam et al., Holender et al. and Freeman because it is suggested by Kodialam et al. Regarding claim 39, RFC-2328 teaches in Section 10 neighbor states for keeping track of connectivity.

Regarding claims 41-42, RFC-2328 teaches in Section 16 calculating of routing table.

15. Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over Golmie et al., Assi et al., Kodialam et al. and Holender et al. as applied to claims 18-21, 24-25, 31-32, 34, 43-46 and 49 above, and further in view of Ashwood Smith (U.S. Patent 6,738,354 B1).

Golmie et al., Assi et al., Kodialam et al. and Holender et al. have been discussed above in regard to claims 18-21, 24-25, 31-32, 34, 43-46 and 49. The difference between Golmie et al., Assi et al., Kodialam et al. and Holender et al. and the claimed invention is that Golmie et al., Assi et al., Kodialam et al. and Holender et al. do not teach to include status of wavelengths as either allocated or unallocated in the database. Ashwood Smith teaches in FIG. 3 to use wavelength availability tables 28a, 28b and 30 during lightpath setup. One of ordinary skill in the art would have been motivated to combine the teaching of Ashwood Smith with the modified WDM network of Golmie et al., Assi et al., Kodialam et al. and Holender et al. because a wavelength availability table keeps track of the availability of wavelengths and avoid assigning

same wavelength to different lightpaths. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to include wavelength availability tables for keeping track of whether a wavelength is allocated or available, as taught by Ashwood Smith, in the modified WDM network of Golmie et al., Assi et al., Kodialam et al. and Holender et al. because a wavelength availability table keeps track of the availability of wavelengths and avoid assigning same wavelength to different lightpaths.

16. Claim 55 is rejected under 35 U.S.C. 103(a) as being unpatentable over Golmie et al., Assi et al., Kodialam et al., Holender et al. and Freeman as applied to claims 37-38, 40, 50-53, 56 and 71-72 above, and further in view of Ashwood Smith (U.S. Patent 6,738,354 B1).

Golmie et al., Assi et al., Kodialam et al., Holender et al. and Freeman have been discussed above in regard to claims 37-38, 40, 50-53, 56 and 71-72. The difference between Golmie et al., Assi et al., Kodialam et al., Holender et al. and Freeman and the claimed invention is that Golmie et al., Assi et al., Kodialam et al., Holender et al. and Freeman do not teach wavelength availability table. Ashwood Smith teaches in FIG. 3 to use wavelength availability tables 28a, 28b and 30 during lightpath setup. One of ordinary skill in the art would have been motivated to combine the teaching of Ashwood Smith with the modified WDM network of Golmie et al., Assi et al., Kodialam et al., Holender et al. and Freeman because a wavelength availability table keeps track of the availability of wavelengths and avoid assigning same wavelength to different lightpaths. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to include wavelength availability tables for keeping track of whether a wavelength is allocated or available, as taught by Ashwood Smith, in the modified WDM network of Golmie et al., Assi et al., Kodialam et al., Holender et al. and

Freeman because a wavelength availability table keeps track of the availability of wavelengths and avoid assigning same wavelength to different lightpaths.

17. Claims 64-67 and 69-70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Golmie et al., Assi et al., Kodialam et al., Holender et al. and Melaku et al. as applied to claims 30, 57-60 and 62-63 above, and further in view of Freeman ("Telecommunication System Engineering" by R. Freeman, John Wiley & Sons, 1980, pp 99-103).

Golmie et al., Assi et al., Kodialam et al., Holender et al. and Melaku et al. have been discussed above in regard to claims 30, 57-60 and 62-63. The difference between Golmie et al., Assi et al., Kodialam et al., Holender et al. and Melaku et al. and the claimed invention is that Golmie et al., Assi et al., Kodialam et al., Holender et al. and Melaku et al. do not teach a machine-readable medium. Freeman teaches in Section 12 stored-program control (SPC). Freeman teaches in p. 100 to store method steps as program in memory for providing instructions to a controller or computer. One of ordinary skill in the art would have been motivated to combine the teaching of Freeman with the modified WDM network of Golmie et al., Assi et al., Kodialam et al., Holender et al. and Melaku et al. because SPC is flexible and expandable such that it is easy to upgrade the system by rewriting the program. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use SPC and store program in machine-readable medium, as taught by Freeman, in the modified WDM network of Golmie et al., Assi et al., Kodialam et al., Holender et al. and Melaku et al. because SPC is flexible and expandable such that it is easy to upgrade the system by rewriting the program.

18. Claims 74-75 are rejected under 35 U.S.C. 103(a) as being unpatentable over Golmie et al., Assi et al., Kodialam et al., Holender et al. and Freeman as applied to claims 37-38, 40, 50-

53, 56 and 71-72 above, and further in view of Deo ("Graph Theory with Applications to Engineering and Computer Science" by N. Deo, Prentice-Hall, 1974).

Golmie et al., Assi et al., Kodialam et al., Holender et al. and Freeman have been discussed above in regard to claims 37-38, 40, 50-53, 56 and 71-72. The difference between Golmie et al., Assi et al., Kodialam et al., Holender et al. and Freeman and the claimed invention is that Golmie et al., Assi et al., Kodialam et al., Holender et al. and Freeman do not teach to use a table or a tree to represent service level topology. Networks are mathematically represented as graphs. Deo teaches in chapter 7 to represent graphs as matrix (or table). One of ordinary skill in the art would have been motivated to combine the teaching of Deo with the modified machine-readable medium of Golmie et al., Assi et al., Kodialam et al., Holender et al. and Freeman to represent network as matrix because matrices are better for computer processing. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to represent service level topology structures as table, as taught by Deo, in the modified machine-readable medium of Golmie et al., Assi et al., Kodialam et al., Holender et al. and Freeman.

Response to Arguments

19. Applicant's arguments filed 13 August 2007 have been fully considered but they are not persuasive.

The Applicant argues that the combination of Golmie et al., Assi et al., Kodialam et al. and Holender et al. does not describe claim 1, as amended:

"applying a set of one or more connectivity constraints that include quality of service (QoS) based criteria on a physical network topology of a wave length division multiplexing

optical network to divide said optical network into separate service levels, wherein the connectivity constraints are based on a conversion criteria; and

determining service level topologies for each of said service levels for each node in the optical network, wherein each service level topology is a network topology smaller than the physical network topology and said each service level topology comprises connectivity between pairs of nodes only for the corresponding service level."

Applicant's arguments do not comply with 37 CFR 1.111(c) because they do not clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. Further, they do not show how the amendments avoid such references or objections.

The Applicant argues, "As stated in the Office Action, the Examiner admits that Golmie does not teach or suggest determining service level topologies. (Office Action, Page 2.) Thus, Golmie cannot teach or suggest a service level topology associated with connectivity constraints based on a conversion criteria. Kodialam simply describes that a network could have either conversion free OXCs or conversion OXCs and layers an IP network over an optical network. Assi describes adaptive routing solutions in a conversion free network. Because neither Kodialam nor Assi relate their concepts to a service level, neither Kodialam nor Assi teach or suggest a service level topology associated with connectivity constraints based on a conversion criteria. Holender discloses simply describes partitioning an electrically switched network into logical networks and does not disclose determining service level topologies in an optical network. Because Holender does not disclose an optical network, Holender cannot teach or

suggest a service level topology associated with connectivity constraints based on conversion criteria."

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

The Applicant argues that the Examiner cites Applicant's detailed description, and not part of the background as support that a smaller service level topology is known in the prior art. The Examiner disagrees. The Examiner cites page 10, last paragraph, "As a result of the set of connectivity constraints, such network topology databases are smaller in comparison to network topology databases that represent all physical connectivity in the network." That is, the Applicant admits that the fact the topology databases are smaller is a consequence of the connectivity constraints. Since the combination of Golmie et al., Assi et al. and Kodialam et al. teaches connectivity constraints, the service level topology of the modified system of Golmie et al., Assi et al. and Kodialam et al. is inherently smaller than the physical network topology. Furthermore, Examiner cites Holender et al. for strengthening the rejection. Holender et al. teaches in FIG. 2 that a logical network topology is smaller than the physical network.

Conclusion

20. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shi K. Li whose telephone number is 571 272-3031. The examiner can normally be reached on Monday-Friday (7:30 a.m. - 4:30 p.m.).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 571 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

skl
23 October 2007

Shi K. Li
Primary Patent Examiner